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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/320,950	05/27/1999	JOHN N. GLOVER	2797.004	5662

7590 12/08/2006
BEN D. TOBOR
BRACEWELL & PATTERSON, LLP
P.O. Box 61389
HOUSTON, TX 77002

EXAMINER	
SORKIN, DAVID L	
ART UNIT	PAPER NUMBER
1723	

DATE MAILED: 12/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/320,950

Applicant(s)

GLOVER, JOHN N.

Examiner

David L. Sorkin

Art Unit

1723

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 59,61-67 and 69-85 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 59,61-67 and 69-85 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-802)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The reply brief filed on 16 October 2006 is acknowledged.
2. PROSECUTION IS HEREBY REOPENED.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 to this non-final Office Action; or,
- (2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 82-85 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. These claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Recitation in claims 82-85 that "the outer periphery has sharp edges" is considered to be new matter. No discussion of the issue of edge sharpness is found in the originally filed disclosure.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 59, 61-67 and 69-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer (US 4,615,796) in view of "CE Refresher: Catalyst Engineering, Part 2" by John Fulton ("Fulton" herein). Regarding claims 59 and 78, Kramer ('796) discloses a method of fluid distribution in a chemical reactor comprising the steps of providing a layer of a plurality of ceramic filter units (see col. 3, lines 34-40; Figs. 1 and 2); contacting an organic based stream with the layer of the plurality of ceramic filter units and passing the organic-based stream through the layer prior to the organic based feed stream contacting a catalyst be in the chemical reactor (see col. 2, lines 20-25; Figs. 1 and 2). Kramer ('796) fails to disclose the units having 3 or more passages surrounding a central passage, through which fluid flows (although annular units, including ones with passages are disclosed in Table 1). Fulton teaches cylindrical units having a central opening and four circular/elliptical openings between the central opening and the periphery (see Fig. 1, third column, fifth row). Note: it is considered that the broadest reasonable definition of ellipse includes circles; just as squares are a special type of rectangle, circles are a special type of ellipse. It is considered that it would have been obvious to one of ordinary skill in the art to have shaped the units of Kramer according to the teachings of Fulton, because Kramer explains that alternative

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unit shapes may be used in the disclosed processes (see Table 2 and col. 4, lines 1-4). Furthermore, Fulton teaches the above-mentioned shape as an alternative to other shapes including spheres (see page 97) and explains that passages in the units can significantly reduce the amount of material needed, while minimizing loss of strength (see pages 97 and 98, Fig. 3). See also the admitted prior art of page 3, lines 7-18 of the instant specification. Regarding claim 61, Kramer ('796) further discloses removing contaminants from a contaminated stream; and providing the contaminated stream to a catalyst bed for further processing in the chemical reactor (see col. 1, lines 52-60; col. 3, lines 4-22; Figs. 1 and 2). Regarding claims 62 and 63, because "packing factor" can be set to any value for a given shape unit merely by varying the size of the unit, and Kramer ('796) explains that unit size should be selected according to an expected particle size to be filtered out, it is considered that it would have been obvious to one of ordinary skill in the art to have optimized the packing factor to suit a particular expected contaminate particle size. Further regarding claim 63, Kramer ('796) discloses packing the ceramic filter units in graduated layers into the chemical reactor with each layer having a different packing factor (see examples 1-3). Regarding claim 64, Fulton further teaches units may have a flute outer periphery (see Fig. 1). Regarding claim 65, Fulton further teaches that units may have a plurality of recessed notches extending inwardly from the outer periphery toward the medial portion of the units (see Fig. 1). Regarding claim 66, in the units taught by Fulton the four openings substantially surround the central opening between the central opening and the outer periphery to thereby define a ring around the central opening (see Fig. 1). Regarding claim 67,

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Kramer ('796) discloses a method of fluid distribution in a chemical reactor comprising the steps of providing a layer of a plurality of ceramic filter units (see col. 3, lines 34-40; Figs. 1 and 2); contacting an organic based stream with the layer of the plurality of ceramic filter units and passing the organic-based stream through the layer prior to the organic based feed stream contacting a catalyst bed in the chemical reactor (see col. 2, lines 20-25; Figs. 1 and 2). Kramer ('796) fails to disclose the polygonal units having 3 or more passages surrounding a central passage, through which fluid flows. Fulton teaches units having a central opening and four circular/elliptical openings between the central opening and the periphery (see Fig. 1, third column, fifth row). Note: it is considered that the broadest reasonable definition of ellipse includes circles; just as squares are a special type of rectangle, circles are a special type of ellipse. Polygonal units are also taught (see Fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have shaped the units of Kramer according to the teachings of Fulton, because Kramer ('796) explains that alternative unit shapes may be used in the disclosed processes (see Table 2 and col. 4, lines 1-4). Furthermore, Fulton teaches the above-mentioned shapes as an alternative to other shapes including spheres (see page 97) and explains that passages in the units can significantly reduce the amount of material needed, while minimizing loss of strength (see pages 97 and 98, Fig. 3). Fulton also notes in the caption of Fig. 1, that the shapes "represent only a few of the almost limitless variety possible". Regarding claim 69, Kramer ('796) further discloses removing contaminants from a contaminated stream; and providing the contaminated stream to a catalyst bed for further processing in the chemical reactor

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(see col. 1, lines 52-60; col. 3, lines 4-22; Figs. 1 and 2). Regarding claims 70 and 76, Fulton further teaches that units may have a plurality of recessed notches extending inwardly from the outer periphery toward the medial portion of the units (see Fig. 1). Regarding claim 71-75, square and rectangular shapes are disclosed in Fig. 1 of Fulton. It is explained that the size of the units should be selected based upon various economic trade-offs (see pages 98-99). Kramer provides examples of unit sizes being 0.5 inches and other sizes within the claimed ranges (see example 1-3). Also see applicant's admission on page 3, lines 7-10 regarding prior art thickness of "3/8 inch" and "approximately 1/8 inch to 1 1/4 inches in diameter". Regarding claim 77, in the units taught by Fulton the four openings substantially surround the central opening between the central opening and the outer periphery to thereby define a ring around the central opening (see Fig. 1). Regarding claims 79-81, the central opening taught by Fulton is circular (see Fig. 1, third column, fifth row). Regarding claims 82-85, Fulton further teaches units with sharp edges as an alternative to units without sharp edges (see Fig. 1).

7. Claims 59, 61-67 and 69-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer ('796) in view of Fulton as applied to claims 59, 61-67 and 69-85 above, and further in view of Hung et al. (DE 3,539,195). While it is considered that the broadest reasonable definition of ellipse includes circles, as discussed above, to the extent that someone would argue that circles are excluded from the set of ellipses, Hung et al. (DE 3,539,195) is relied upon as establishing the art recognized equivalence of circular and elliptical openings in ceramic units. As explained in pages

8-10, especially lines 6 and 7 of page 9, of the English translation of Hung ('195), elliptical openings are recognized as and alternative to circular openings. It is considered that it would have been obvious to one of ordinary skill in the art to have substituted elliptical holes for the circular holes discussed above, because circular holes and elliptical holes are recognized in the art as alternative for the same purpose according to Hung ('195) pages 8-10, especially lines 6 and 7 of page 9.

Response to Arguments

8. As applicant points out in the reply brief, the originally filed specification (specifically original claim 5) expressly states that "elliptical" shape includes circles. Applicant also refers to an office action on an application of which the instant application is a divisional CPA. It is noted that any examiner-statement in that application which applicant expressly abandoned in favor of the instant divisional application, is not a binding precedent in this application. The PTO is required to use the broadest reasonable meaning of terms consistent with the specification. The broadest reasonable meaning of "elliptical" includes circular shapes. Just as squares are a special case of rectangles, circles are a special case of ellipses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Sorkin whose telephone number is 571-272-1148. The examiner can normally be reached on 9:00 -5:30 Mon.-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



David L. Sorkin
Primary Examiner
Art Unit 1723

DLS

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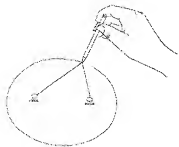
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Ivars Peterson's MathTrek

September 2, 1996

Beyond the Ellipse

There's a simple trick one can use to draw an ellipse. Tie the ends of a length of string to two pins (or thumbtacks) stuck in a sheet of paper on a drawing board. Then, keeping the string taut with the point of a pencil, allow the pencil to trace a path around the pins. The resulting curve is an ellipse, with the two pins, or fixed points, representing its foci.



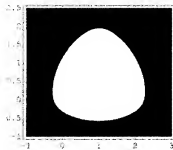
Drawing an ellipse.

This drawing method takes advantage of the geometric fact that the sum of the distances from the foci of an ellipse is the same for all points on the curve. Thus, if A and B are the foci of an ellipse, the total distance ($AP + PB$) from the foci to any point P on the curve is constant.

One can also ask what curve results when the total distance from *three* given points is kept the same. For example, suppose that the pins are placed at the corners of an equilateral triangle. In this case, it's not possible to draw the figure using a pencil and string because the pins would end up getting in the way of the string. However, one can explore this possibility using a computer.

That's precisely what Bilge Demirköz, a 16-year-old high school student in Istanbul, Turkey, did to investigate what happens for not only three but also four fixed points. She presented a guided tour of her findings in this neglected corner of mathematics one evening at the Seattle Mathcamp (see last week's MathLand article, [Math Camp](#)).

In the case of three points, her computer plots showed an oval figure that was obviously neither a circle (one fixed point) nor an ellipse (two fixed points). She called the result a trisoid. Its precise form depended on the given total length and the relative positions of the three given points. Four fixed points led to another curiously rounded shape.



Example of a trisoid.

When Demirköz looked for the geometric form that results when the sum of the distances from two points minus the distance from a third point is kept constant, she found additional surprises. In this case, depending on the chosen constant distance, the figure has an outer boundary that looks somewhat like an ellipse (though it isn't) and sometimes has an inner boundary -- a hole -- that looks like a circle (but isn't).

These computer explorations represent just the first stage in a potentially rewarding mathematical investigation. They raise a variety of questions and prompt a number of conjectures about the characteristics and behavior of these curves.

Such results may even have relevance to physical systems, Demirköz notes. For example, elliptical orbits arise when one body orbits another under the influence of gravity. It's possible that certain gravitational or electric fields could lead to these other kinds of orbits.

In *Mathematics: Queen and Servant of Science*, Eric Temple Bell writes: "A circle no doubt has a certain appealing simplicity at first glance, but one look at an ellipse should have convinced even the most mystical of astronomers that the perfect simplicity of the circle is akin to the vacant smile of complete idiocy. Compared to what an ellipse can tell us, a circle has little to say. Possibly our own search for cosmic simplicities in the physical universe is of this circular kind -- a projection of our uncomplicated mentality on an infinitely intricate external world."

Perhaps the trisoid and its geometric cousins illuminate a small corner of the cosmic complexity.

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References:

Bell, Eric Temple. 1987. *Mathematics: Queen and Servant of Science*. Washington, D.C.: Mathematical Association of America.

Gardner, M. 1995. *New Mathematical Diversions*. Washington, D.C.: Mathematical Association of America.

Trisoid diagram created by I. Peterson using Mathematica 3.0 (<http://www.wolfram.com>).

Comments are welcome. Please send messages to Ivars Peterson at ipeterson@maa.org.

M

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant: Glover, John N.)	
Filed: May 27, 1999)	Art Unit: 1723
Application No.: 09/320,950)	
)	Primary Examiner: David Sorkin
For: Filtering Medium and Method for)	
Contacting Solids Containing Feeds for)	Attorney Docket No: 105218.04
Chemical Reactors)	(formerly 020781.04)

DECLARATION OF JOHN N. GLOVER

I, John N. Glover, declare that I am over the age of twenty-one (21) years of age and am fully competent to make this declaration. I have personal knowledge of the facts set forth in this declaration and they are true and correct. I declare:

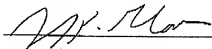
1. I am the President of Crystaphase International, Inc. and its related corporate entities (hereinafter "Crystaphase"), and maintain an office at Crystaphase at 16945 Northchase Drive, Suite 1610, Houston, TX, 77060-6029. I have been employed by Crystaphase since 1989 to the present as the President. I am the named inventor in the above-identified patent application and am familiar with the disclosure in the above-identified patent application.
2. I have worked in the petroleum refining and petrochemical industries for at least twenty-five years. I am familiar with ceramic filter units, catalysts, and recycling of these units.
3. I am a named inventor of the subject application and thus would be considered of above-ordinary skill in the art of ceramic filter units and associated methods. In my position of President, I have supervised numerous individuals and therefore am knowledgeable about the level of understanding of one with ordinary skill in the art in the field of ceramic filter units.

4. My educational experience includes undergraduate studies in Biology and Chemistry. I have performed numerous experiments on the subject matter of the above referenced patent application. I am extremely familiar with terms in the industry and the understanding associated with those terms throughout the industry
5. In my Declaration of February 25, 2008, that was submitted to the U.S. Patent and Trademark Office in connection with this application, I made reference to test results performed by Crystaphase that involved the BT-750 ¾" ceramic wagon wheel unit. In the Declaration, I incorrectly referred to the BT-750 ¾" ceramic wagon wheel unit as "prior art" in relation to the claimed subject matter in my present patent application.
6. The BT-750 ¾" ceramic wagon wheel unit is manufactured by ACCCO, Inc. of Roseville, Ohio ("ACCCO") and offered for sale by Catalyst Trading Company, Ltd. of Houston, Texas ("CTC"). A screenshot from CTC's Internet website is included as Exhibit A to this Declaration. This screenshot shows that CTC was selling the BT-750 ¾" ceramic wagon wheel units as recently as August of 2008.
7. ACCCO manufactures the BT-750 ¾" ceramic wagon wheel for CTC. CTC first began offering the BT-750 ¾" ceramic wagon wheel unit for sale in or around 2002. This was approximately four (4) years after the effective filing date of May 29, 1998, for the present patent application.
8. ACCCO also manufactures ceramic filter units for Crystaphase, including certain units that are described and/or claimed in the present application. ACCCO has manufactured ceramic filter units for Crystaphase for approximately ten (10) years, since about 1999. I am generally aware of the ceramic units manufactured by ACCCO that can potentially be used in the same industry as those ceramic filter units that ACCCO manufactures specifically for Crystaphase.
9. In view of the fact that the BT-750 ¾" ceramic wagon wheel unit was first offered

for sale approximately four (4) years after May 29, 1998, the wagon wheel unit is not "prior art" in relation to this present patent application.

10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the publication or any patent issued thereon.

Date: June 11, 2009



John N. Glover



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BT-1000 1" Ceramic Wagon Wheel	CTC	Bed Topping	1"	Fresh	500 cf.
855 MD	Criterion	Bed topping	5/8" wagon wheel	Fresh	3,010 lbs.
A-541	Albemarle	Bed topping	5.4mm	Fresh	367 lbs.
BT-500 1/2" Ceramic Wagon Wheel	CTC	Bed Topping	1/2"	Fresh	500 cf.
BT-750 3/4" Ceramic Wagon Wheel	CTC	Bed Topping	3/4"	Fresh	500 cf.
C-514	Criterion	Bed Topping	4.0mm	Fresh	13,000 lbs.
C-514	Criterion	Bed topping	8.0mm	Fresh	15,000 lbs.
CTC 3/16" Raschig Ring	CTC	Bed Topping	3/16"	Fresh	480 cf.

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705 F.2d 1565, 4 ITRD 1769, 217 U.S.P.Q. 865, 1 Fed. Cir. (T) 21
(Cite as: 705 F.2d 1565, 1 Fed. Cir. (T) 21)

H

United States Court of Appeals,
Federal Circuit.

AKTIEBOLAGET KARLSTADS MEKANISKA
WERKSTAD and KMW-Johnson, Inc., Appellants,
v.

UNITED STATES INTERNATIONAL TRADE
COMMISSION and Beloit Corporation, Appellees.
Appeal No. 82-21.

April 18, 1983.

Foreign manufacturer of papermaking machinery
appealed from final determination of the International
Trade Commission finding two patents relating to
“headbox” components of papermaking machines
valid and infringed, resulting in injury to a domestic
industry. The Court of Appeals, Rich, Circuit Judge,
held that only one of the two patents was valid and
infringed, requiring vacation and reconsideration of
determination that there was injury to a domestic
industry.

Affirmed in part, reversed in part, vacated in part,
and remanded.

West Headnotes

[1] Patents 291 ↪ 112.3(2)**291 Patents**

291IV Applications and Proceedings Thereon
291k112 Conclusiveness and Effect of Deci-
sions of Patent Office
291k112.3 As to Patentability
291k112.3(2) k. Invention. Most Cited

Cases

There is no presumption, or any reason to assume,
that everything disclosed in a patent specification has
been invented by patentee.

[2] Patents 291 ↪ 16(2)**291 Patents**

291II Patentability

291III(A) Invention; Obviousness

291k16 Invention and Obviousness in Gen-
eral

291k16(2) k. Prior Art in General. Most
Cited Cases

Patent became prior art for purpose of determining
obviousness by virtue of admission and statute. 35
U.S.C.A. §§ 102(g), 103.

[3] Patents 291 ↪ 314(5)**291 Patents**

291XII Infringement

291XIII(C) Suits in Equity

291k314 Hearing

291k314(5) k. Questions of Law or
Fact. Most Cited Cases
Obviousness of a patent is a legal conclusion based
on factual determinations and not a factual determi-
nation itself. 35 U.S.C.A. § 103.

[4] Patents 291 ↪ 324.55(4)**291 Patents**

291XII Infringement

291XIII(C) Suits in Equity

291k324 Appeal

291k324.55 Questions of Fact, Ver-
dicts, and Findings

291k324.55(3) Issues of Validity
291k324.55(4) k. Novelty, Inven-
tion, Anticipation, and Obviousness. Most Cited
Cases
Factual determination of content of prior art must be
upheld if and only if it is both arrived at through
proper application of relevant law and supported by
substantial evidence. 35 U.S.C.A. § 103.

[5] Patents 291 ↪ 16.17**291 Patents**

291II Patentability

291III(A) Invention; Obviousness

291k16.17 k. Mechanical Devices. Most
Cited Cases
(Formerly 291k17)
Claims 1, 12, 15, 16, and 22 of reissue patent No.

705 F.2d 1565, 4 ITRD 1769, 217 U.S.P.Q. 865, 1 Fed. Cir. (T) 21
(Cite as: 705 F.2d 1565, 1 Fed. Cir. (T) 21)

28,269 relating to “headbox” component of paper-making machine was not invalid for obviousness, and was infringed. 35 U.S.C.A. § 103.

[6] Patents 291 ↪16.17

291 Patents

291III Patentability

291III(A) Invention; Obviousness

291k16.17 k. Mechanical Devices. Most Cited Cases

Claims 4, 5, and 6 of patent No. 3,923,593 relating to a “headbox” component of a papermaking machine were invalid for obviousness. 35 U.S.C.A. § 103.

[7] Customs Duties 114 ↪85(13)

114 Customs Duties

114VII Protests and Review

114k85 Court of Appeals for the Federal Circuit (Formerly Court of Customs and Patent Appeals) and Proceedings Therein

114k85(13) k. Determination and Disposition of Cause. Most Cited Cases

In light of finding that only one of two patents relating to “headbox” components of papermaking machines were valid and infringed by foreign manufacturer, remand to the International Trade Commission was required for reconsideration of its determination that there was injury to a domestic industry. Tariff Act of 1930, § 337, as amended, 19 U.S.C.A. § 1337.

[8] Customs Duties 114 ↪84(2)

114 Customs Duties

114VII Protests and Review

114k84 Court of International Trade (Formerly Customs Court) and Proceedings Therein

114k84(2) k. Proceedings in General. Most Cited Cases

(Formerly 114k84)

Procedures followed by the International Trade Commission in determining that foreign manufacturer, by infringing certain patents, injured a domestic industry did not contravene provisions of the Tariff Act of 1930. Tariff Act of 1930, § 337(c), (g)(2), as amended, 19 U.S.C.A. § 1337(c), (g)(2).

Patents 291 ↪328(2)

291 Patents

291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original. Most Cited Cases

Patents 291 ↪328(4)

291 Patents

291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(4) k. Reissue. Most Cited Cases
3,607,625. Valid and infringed.

28,269. Valid and infringed.

Patents 291 ↪328(2)

291 Patents

291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original. Most Cited Cases
3,923,593. Claims were invalid for obviousness.

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291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original. Most Cited Cases
3,939,037. Cited as prior art.

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William C. Stueber, Chicago, Ill. and Victor M. Wigman, Arlington, Va., argued for Beloit Corp. With them on brief were Steven H. Noll, Chicago, Ill., and Dirk J. Veneman, Beloit, Wis.

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Before FRIEDMAN, RICH, BENNETT, MILLER
and SMITH, Circuit Judges.

RICH, Circuit Judge.

This appeal is from the final determination of the United States International Trade Commission (ITC) of November 18, 1981, in Investigation No. 337-TA-82A, USITC Publication No. 1197 (November 1981), entitled "In the Matter of Certain Headboxes and Papermaking Machine Forming Sections for the Continuous Production of Paper, and Components Thereof." We affirm in part, reverse in part, vacate in part, and remand.

The underlying basis of the ITC's investigation resides in two patents owned by appellee Beloit Corporation (Beloit), a leading domestic manufacturer of papermaking machinery. They are Reissue patent No. 28,269 (the '269 patent) granted December 10, 1974, a reissue of original patent No. 3,607,625 to Hill, Parker, and Hergert (the '625 patent), issued September 21, 1971, on application serial No. 698,633 filed January 17, 1968; and Verseput patent No. 3,923,593 (the '593 patent), issued December 2, 1975, on application serial No. 434,048 filed January 17, 1974, as a continuation-in-part of an earlier application filed December 3, 1971. Both of these patents in suit issued to Beloit as assignee. These two patents, '269 and '593, were held to be infringed by the importation and sale of apparatus of appellants, a Swedish manufacturer of papermaking machinery and its domestic licensee (herein jointly KMW).

There was a prior related investigation, No. 337-TA-82, 213 USPO 291 (1981), based on the same underlying facts, in which the *1567 President of the United States, on June 8, 1981, disapproved, for policy reasons, the ITC's determination pursuant to section 337(g)(2) of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337(g)(2). In an explanatory statement, the President said:

My decision does not mean that the patent holder in this case is not entitled to a remedy. However, I do not have the authority to revise the USITC's remedy. An exclusion order directed only to the respondent's products, or a narrowly drafted cease and desist order would appear to be entirely justified and appropriate. I, therefore, strongly urge the Commission to take such action expeditiously on

its own motion.

Thereafter the ITC instituted the present investigation, which was to be based, however, on the record compiled in the prior investigation with no issue already addressed to be relitigated absent new evidence and good cause. The ITC again determined there had been **23 a violation of § 337 and issued a new exclusion order, the relevant portion of which reads:

1. Multi-ply headboxes and papermaking machine forming sections for the continuous production of paper, and components thereof or spare parts therefor, manufactured by Aktiebolaget Karlstads Mekaniska Werkstad, of Karlstad, Sweden, or any of its affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns, which infringe claims 1, 12, 15, 16, or 22 of U.S. Letters Patent RE 28,269 and claims 4, 5, or 6 of U.S. Letters Patent 3,923,593 are excluded from entry into the United States for the remaining term of the patents, except where such importation is licensed by the patent owner;

2. KMW papermaking machine forming sections which are imported individually and not in combination with multi-ply headboxes are not subject to this order.

Issues

The issues presented by this appeal are:

1. The validity of the claims in suit;
2. Infringement of those claims;
3. Injury to the domestic industry under § 337;
4. Whether appellants have been improperly denied procedural rights in the second investigation.

Background

The papermaking machines here involved are large, costly devices designed to run continuously at very high speeds. The papermaking machine component most directly involved herein is the headbox, which is the part which delivers a slurry of paper pulp and water, known as paper stock, to a surface where it is formed and dried, known as the wire. The headbox

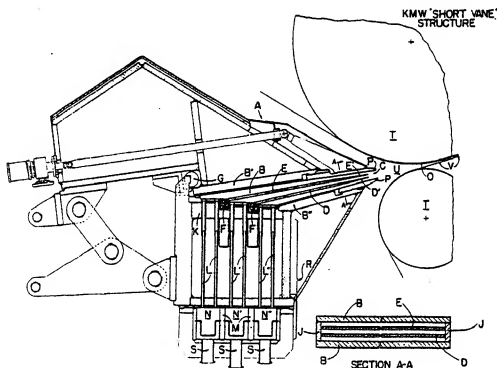
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must deposit the stock on the wire very uniformly. Otherwise, the machine will produce paper having streaks, clumps of fiber, or uneven tensile strength.

The paper these machines produce may be either single ply or multiple ply (multi-ply). A machine designed to produce single ply paper is referred to as a single ply machine, and its headbox a single ply headbox. Similarly, a machine designed to produce multi-ply paper is referred to as a multi-ply machine, and its headbox a multi-ply headbox.

KMW's allegedly infringing headboxes, all of which were multi-ply headboxes, may be understood from the following figures based upon Beloit's Exhibit "A". It is a diagrammatic, sectional, side view of the headbox portion of a papermaking machine shown as adapted to feed liquid paper stock into the space between the endless wire belts of a twin-wire type of paper former, the belts travelling around the supporting rolls marked I.

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****24** Stock flows from the three header inlets S at the bottom of the drawing to a preslice area R and then into slice chamber B. The slice chamber is divided by trailing elements or vanes D and E, pivotably mounted at F at their upstream ends. The downstream ends of the trailing elements are unattached and positioned by the pressure on them exerted by the flowing stock. The trailing elements extend transversely (perpendicular to the figure) the entire width of the slice chamber, thus dividing the slice chamber into a plurality of relatively shallow passages. The embodiment shown in the figure has come to be known as the "short vane" structure because the vanes and as-

sociated structures are wholly contained within the slice chamber B. Another embodiment, the "vane without foil" embodiment, delivers air at the trailing edge of the vane through air passages within the vane itself, thus creating an "air wedge" at the trailing edge. In a third embodiment, the "vane with foil" embodiment, long foil members extend from the trailing edges of the vanes D beyond the confines of the slice chamber.

The small figure marked "SECTION A-A" is a broken or lengthwise contracted view through the slice chamber B and the vanes D and E. The space inside the chamber which contains the paper stock is called

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the "pond" and is closed at either end by what are called "pondsides," shown at J. The vanes or trailing elements, as will be seen, extend from pondsides to pondsides, continuously, the **25 break in the middle of the drawing being a drafting convention indicating that a central portion of the chamber has been omitted for convenience of illustration. The floating vanes D and E, attached only at their upstream ends, are the feature with which we are here principally concerned.

The Patent Claims in Issue

As enumerated in the ITC's exclusion order, five claims of the '269 patent are in issue, namely, 1, 12, 15, 16, and 22. Three *1569 claims of the '593 patent are in issue, 4, 5, and 6.

The invention disclosed in the '269 patent by the joint inventors Hill, Parker, and Hergert (Hill et al.), who filed the first of the applications in the series before

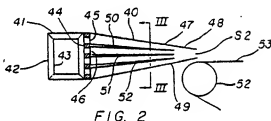


FIG. 2

Explaining the essentials, 40 is a headbox with an inlet header 43 feeding stock to a perforated plate 44 at the upstream end of slice chamber 47 having slice S2. Components 50, 51, and 52 are the trailing elements anchored at their upstream ends to plate 44. Fig. 3 is a section on the line III-III looking to the left. Fig. 5 is a plan view of element 50. Stock flowing out of S2 is deposited on Fourdrinier wire 53 carried around roll 52 and moving to the right. The involved claims read as follows:

**26 1. In a headbox for delivering stock to a forming surface, the headbox having a slice chamber and a slice opening, the improvement comprising a plurality of trailing elements positioned in the slice chamber, each of said elements extending transversely of said headbox from pondsides to pondsides, means anchoring said elements only at their upstream ends at locations spaced generally

us, is illustrated as embodied in a single ply headbox arranged to flow paper stock onto the forming wire belt of a Fourdrinier type papermaking machine, which has a single wire belt or screen through which the water of the paper stock is removed, leaving a fiber mat, subsequently further processed to make finished paper. The gist of the invention of the claims in suit is the use in the headbox slice chamber of one or more trailing elements, anchored at their upstream ends, self-positionable through fluid pressure, and extending all the way across the slice chamber, i.e., pondsides to pondsides. There is nothing in these claims which limits this invention to use in a single ply headbox; it can be and is used in the same way in a multi-ply headbox for the same advantages. The '269 patent claims in suit will be more easily understood in connection with an illustration. We reproduce Figs. 2, 3, and 5 of patent '269:

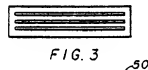


FIG. 3

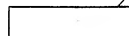


FIG. 5

perpendicular to the stock-flow stream with their downstream portions unattached and constructed to be self-positionable so as to be solely responsive to forces exerted thereon by the stock flowing towards the slice.

12. In a headbox for delivering stock to a forming surface, the headbox having a slice chamber and a slice opening, the improvement comprising a trailing element positioned in the slice chamber, said element extending transversely of said headbox from pondsides to pondsides, means anchoring said element only at its upstream end with its downstream portion unattached and constructed to be self-positionable so as to be solely responsive to forces exerted thereon by the stock flowing towards the slice.

15. In a headbox for delivering stock to a forming surface, the headbox having a slice chamber

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and a slice opening, the improvement comprising:

perforate walls [sic] means mounted in said slice chamber transversely of said slice chamber and located in an upstream portion of said slice chamber,

a plurality of rigid plates,

***1570** means for attaching the upstream ends of said plates to said wall means,

said plates extending transversely of said headbox from pondside to pondside and projecting downstream generally in the direction of stock flow,

and trailing elements attached to the downstream ends of said plates,

said elements being attached to said plates only at their upstream ends with their downstream portions unattached and constructed to be self-positionable so as to be solely responsive to forces exerted thereon by the stock flowing towards the slice.

16. The structure of claim 15 wherein said elements are in the form of sheets extending transversely of said headbox.

22. In a headbox for delivering stock to a forming surface, the headbox having a slice chamber and a slice opening, the improvement comprising:

perforate wall means mounted in said slice chamber and located in an upstream portion of

said slice chamber,

a rigid plate,

means for attaching the upstream end of said plate to said wall means,

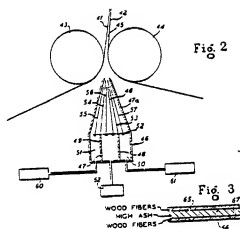
said plate extending transversely of said headbox from pondside to pondside and projecting downstream generally in the direction of stock flow,

****27** and a trailing element attached to the downstream end of said plate,

said element being attached to said plate only at its upstream end with its downstream portion unattached and constructed to be self-positionable so as to be solely responsive to forces exerted thereon by the stock flowing towards the slice.

Beloit's Verseput '593 patent is an application of the Hill et al. invention of the '269 patent to a machine for making multiple ply paper, for example, a paper having a core of one kind of stock integrated with surface layers formed from a different stock, all three layers being laid down on the wire or between the wires of a forming section at the same time from the same headbox. This requires means for feeding different stocks simultaneously to the headbox and keeping them separated until they are delivered from the slice. It requires, in other words, a multi-ply headbox. Fig. 2 of the patent diagrammatically illustrates the headbox feeding multiple stocks from the slice into the space between twin forming wires, and Fig. 3 is a section through a 3-ply paper produced thereby. The claims in issue follow the drawings.

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4. In a machine for making a multi-ply web such as a paper from stocks having a slurry of fibers in a liquid carrier, the combination comprising:

****28** a foraminous forming surface for receiving a liquid stock and dewatering the stock;

a headbox having a slice chamber formed by slice walls terminating in slice lips which form a slice opening for directing a jet stream onto the forming surface; said slice lips extending substantially the same distance toward said surface; said headbox also having a preslice chamber immediately upstream of the slice chamber; a first rigid partition extending across said preslice chamber dividing the preslice chamber into multiple stock chambers;

a second partition extending across said slice chamber forming a continuation of said first partition and dividing the slice chamber into multiple stock chambers to extend to the slice opening; said second partition being supported ***1571** only at its upstream end with its downstream portion unattached and constructed to be self-positionable so as to be responsive to forces exerted thereon by the stock flowing toward the slice so that the stocks from the multiple chambers exit through the slice opening at uniform velocity;

and means for supplying stocks of different characteristics to each of said multiple stock chambers in the preslice chamber.

5. In a machine for making a multi-ply web such as a paper from stocks having a slurry of fibers in a liquid carrier constructed in accordance with claim 4:

wherein said forming surface is comprised of a first looped traveling forming wire and a second looped traveling forming wire;

and guide means within said wires guiding the wires to provide a forming throat receiving stock from said slice followed by a forming run between the said wires.

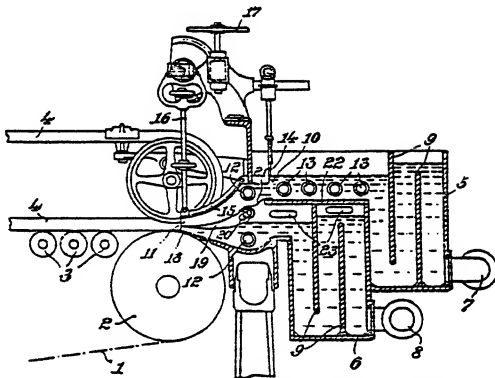
6. In a machine for making a multi-ply web such as a paper from stocks having a slurry of fibers in a liquid carrier constructed in accordance with claim 4:

including a third partition extending across said preslice chamber so that the headbox is divided into at least three stock chambers comprising two outer chambers and one intermediate chamber and including a fourth partition being a continuation of the third partition which extends to the slice opening and is self-positioning.

Prior Art References

German patent No. 899,896 published in 1953 discloses a multi-ply headbox as shown in the following drawing:

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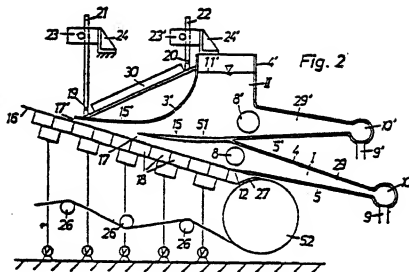


****29** The illustrated headbox has upper flow-out nozzle 11 and lower flow-out nozzle 18, between which is separating tongue 19 which can be rotated about pivot 20 and also adjusted longitudinally to some extent. The rotatable separating tongue delimits the *1572 outlet cross-sections of the two flow-outs, and thus, the patent teaches, adjusts the relative amount of pulp expelled from one with respect to the other. Note that there are two "breastboxes" 5 and 6,

which are supplied pulp separately from lines 7 and 8, respectively, thus enabling the making of multi-ply paper.

French patent No. 1,490,429 granted in 1967 likewise discloses the headbox end of a multi-ply papermaking machine. Figure 2 is reproduced:

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**30 Shown are pulp distributors I and II; separated by lip 15 which is pivoted at 51 and is turned to regulate slot 17 between lip 15 and screen 16 to obtain the desired mixture of the stocks from distributors I and II, respectively. As was true of the device disclosed in the German patent, the headbox of the French patent has separate stock supply systems, starting with distribution conduits 9 and 9', and collectors 10 and 10'. It differs from the German patent in that the two stocks supplied are laid on screen 16 in succession, one after the other, instead of simultaneously.

A third patent asserted by KMW to be prior art is U.S. patent No. 3,939,037 (the ''037 patent') issued in 1976 to Hill, a named coinventor in the ''269 patent', as a sole inventor on application serial No. 451,225, which was a continuation of a continuation-in-part of a division of the application which matured into the patent reissued as the ''269 patent'. As might be expected, the specifications of the ''037' and ''269 patents' strongly resemble one another. Specifically, the ''037 patent' teaches a headbox with self-positionable trailing elements, and mentions that

*** it may be more convenient to have the flexible members *** extend transversely of the slice chamber in the form of a full width sheet *** where the transverse dimension of the preslice flow chamber is relatively narrow.

**31 As developed later in this opinion, it is neces-

sary to make a distinction between Hill's sole invention (later explained) as "prior art" under 35 U.S.C. §§ 102(g)/103 and the disclosure of the Hill ''037 patent', as such, which is not § 103 "prior art."

Finally, the ''269 patent' is § 103 "prior art" with respect to the ''593 patent'.

OPINION

The '269 Reissue Patent in Suit

Validity

The ITC agreed with the presiding officer's finding that KMW had not rebutted *1573 the ''269 patent's presumption of validity, and so adopted his determination that the ''269 patent' is valid and enforceable.

As to the ''037 patent', the presiding officer concluded

*** that the ''037 patent' does not teach or suggest the use of trailing elements which are full width sheets extending pondside to pondside in any use other than a narrow-width headbox.

Thus, he regarded the subject matter of claims 1 and 12 of the ''269 patent' as patentably distinct from the invention disclosed in the ''037 patent'. He was also persuaded by the fact that the examiner who ultimately allowed the ''269 patent' had made, but later withdrew, a rejection based on the ''037 patent'. The

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presiding officer appreciated that the '037 and '269 patents originated from the same application, opining that "this history would seem to weaken [KMW's] contention that the '037 patent truly constitutes prior art over [sic, against] the '269 patent."

As to the German patent, the presiding officer thought it more reasonable to conclude that the separating tongue disclosed therein, judging from its function, is fixed rather than free. He noted the testimony of KMW's expert, Mr. Eric Stenberg, that regardless of whether the disclosed separating tongue is fixed or free, it would have been obvious to one of ordinary skill in the art that the disclosed separator tongue could be free, but found more persuasive the testimony of Beloit's expert, Dr. Waller, who testified that it would have been unthinkable to one of ordinary skill in the art to have a free member within the slice chamber. The presiding officer also thought it significant that the German patent had been considered by the patent examiner who ultimately allowed the '269 patent. In addition, the presiding officer noted the presence of several indicia of nonobviousness including the commercial success of papermaking machines incorporating the claimed invention and the failure of others to solve the long-standing problems solved by the claimed invention. As to the French patent, the presiding officer thought it teaches no more than the conventional thinking that **32 any dividing element within the slice chamber had to be fixed in position.

KMW contends that the subject matter of claims 1 and 12 of the '269 patent is anticipated by the '037 patent's disclosure of the use of full width trailing elements in a narrow headbox. It also contends that the invention claimed in the '269 patent would have been obvious from the German patent. Furthermore, it contends that the subject matter of claims 15, 16, and 22 of the '269 patent would have been obvious from the combined teachings of the '037 and French patents. It maintains that the presiding officer made two fundamental errors in determining nonobviousness. First, it contends that he treated self-positionable trailing elements as a "basis for patentability" of the '269 patent, when in fact they were part of the prior sole invention of Hill. Second, the presiding officer is said to have accepted Beloit's contention that its headbox solved several long-standing problems in the papermaking art.

Underlying KMW's argument of anticipation is the premise that the '037 patent is prior art with respect to the '269 patent. KMW cites no statutory basis for this premise nor is one presented by the facts of record. The '037 and '269 patents, being derived from the same parent application, have the same effective filing date. It apparently is based instead on Beloit's statement that "the ['037] patent is unquestionably the most pertinent prior art with respect to the headbox claimed in the '269 patent." Appellants present this statement as an admission that the '037 patent, as such, is prior art.

Beloit admits making the quoted statement but disagrees with KMW's interpretation. When asked at oral argument whether Beloit admitted the '037 patent was technical prior art, its counsel responded:

Only as far as the dangling or trailing element concept [is concerned]. It is not technical prior art for the entire wording of the specification because the two cases were co-pending. They go back to exactly *1574 the same filing date. They derive from the same basic application. You cannot take the words, all the words of the specification, and say they are prior art because you cannot use the words and go to a date earlier than the Hill et al. ['269] patent. And we say they are prior art, that Hill alone ['037] is prior art, because it taught the dangling element, but that was the generic concept of an unsupported self-positionable element.

Thus, the parties agree that there has been an admission, but disagree over what has been admitted. In resolving this disagreement, we cannot take an arguably ambiguous statement and construe it in the manner most detrimental to Beloit, regardless of its explanations and attempted clarifications. Rather, it is necessary to consider everything that has been said about what is prior art. *In re Nomiva*, 509 F.2d 566, 571, 184 USPQ 607, 612 (Cust. & Pat.App.1975). Beloit's**33 statements of record in this case include those already quoted, as well as a longer discussion of what part of the '037 patent is prior art, similar to its remarks at oral argument, in its post-hearing brief to the Commission, as well as remarks in its brief and additional remarks at oral argument. These statements taken together demonstrate that Beloit has consistently insisted that Hill alone did not invent a headbox having full width trailing elements, despite the fact that Beloit has used some language which

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might suggest otherwise. They lead us to conclude that Beloit has admitted only that Hill's work was prior to that of the joint inventors, and that he invented a headbox having self-positionable trailing elements, but not full width trailing elements. The record, taken as a whole, supports only this view.

[1] Having determined the extent of Beloit's admission of Hill's prior invention, it must now be resolved whether, as KMW alleges, Hill alone invented *more* than Beloit has admitted. Specifically, KMW argues that the description of full width trailing members in the '037 patent, in which Hill is named as the sole inventor, demonstrates that Hill by himself invented a headbox incorporating such full width trailing members. The short answer to this argument is that there is no presumption, or any reason to assume, that everything disclosed in a patent specification has been invented by the patentee. *In re Clemens*, 622 F.2d 1029, 1036, 206 USPQ 289, 297 (Cust. & Pat.App.1980). See *In re DeBaun*, 687 F.2d 459, 214 USPQ 933 (Cust. & Pat.App.1982). This is especially significant in this case. The embodiment comprising full width trailing members is an improvement on, and thus the best mode of practicing, what has been conceded by Beloit to be Hill's prior invention. This improvement was unquestionably known to Hill, who participated in its development. Thus, 35 U.S.C. § 112, which requires an inventor to set forth the best mode contemplated by him of carrying out his invention, required Hill in this instance to retain the description of full width trailing sheets in his application when it was divided out of the joint application, regardless of whether it was his invention. Under these circumstances, there is no reason to believe that Hill's invention is anything more than Beloit has conceded.

[2] The above analysis leads us to conclude that Beloit has admitted, and admitted accurately, that Hill by himself invented a headbox having self-positionable trailing elements before the invention of other embodiments of that concept by Hill, Parker, and Hergert; but that his headbox did not have full width trailing elements. This is an admission of prior invention by another in this country, and so Hill's headbox becomes prior art by virtue of this admission and 35 U.S.C. § 102(g). Hill's headbox is therefore prior art for the purpose of determining obviousness under 35 U.S.C. § 103, especially here where the joint inventors Hill et al. were undeniably aware of

Hill's prior work, and the evidence of priority, an admission, is conclusive. *In re Clemens*, 622 F.2d 1029, 206 USPQ 289 (Cust. & Pat.App.1980).

****34** [3, 4] We must now decide whether the invention claimed in the '269 patent would have been obvious to one of ordinary skill in *1575 the art from knowledge of the Hill invention, the German patent, the French patent, or any combination of their teachings. In so deciding, it does not matter that we have, as a matter of law, defined the Hill invention more narrowly than did the presiding officer, who apparently believed, as we do not, that Hill by himself invented full width trailing members, at least as used in a narrow headbox, because his patent describes it. Obviousness is a legal conclusion based on factual determinations and not a factual determination itself. *General Motors Corp. v. ITC*, 687 F.2d 476, 480, 215 USPQ 484, 487 (Cust. & Pat.App.1982), cert. denied, --- U.S. ---, 103 S.Ct. 729, 74 L.Ed.2d 953 (1983). The factual determination at issue concerns the scope and content of the prior art. We must uphold this factual determination if and only if it is both arrived at through the proper application of the relevant law and supported by substantial evidence. Our disagreement with the presiding officer's view concerning the scope and content of the prior art is on the former grounds; the '037 patent is not prior art with respect to the '269 patent as a matter of law. Despite this disagreement, we may nevertheless affirm the legal conclusion of the ITC with respect to obviousness if we agree with it, for it is, ultimately, that conclusion and that conclusion alone which we review.

[5] With regard to the specific issue now under consideration, whether the invention claimed in the '269 patent would have been obvious to one of ordinary skill in the art when made, our conclusion, the same as that of the ITC, is that it would not have been. Knowledge of Hill's sole invention would not have suggested a headbox having the pondsides-to-pondsides elements recited in the '269 patent claims in suit. The separating tongue of the German patent is disclosed to serve, and actually serves, a purpose completely different from that of the self-positionable trailing elements of the claimed invention. As noted earlier in this opinion, adjustable tongue 19 determines by its fixed setting the relative outflow from the two pulp supplies whereas the '269 trailing sheets do nothing of the kind, being free when the headbox containing them is in use. From this it follows that a

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combination of the teachings of the Hill invention and the German patent does not render the claimed invention obvious within the meaning of § 103. With regard to the French patent, the lip disclosed therein is also fixed rather than free, so that the French patent teaches nothing more material than what can be learned from the German patent.

Finally, there remains the dispute of the parties over the existence and effect of indicia of nonobviousness, or so-called "secondary considerations," associated with the '269 headbox. Assuming, arguendo, that KMW is correct in contending that there are reasons to discount them, we nevertheless adhere to the legal conclusion that the '269 patent is valid, based on the analysis set forth above.

*****35 Infringement***

The presiding officer concluded that KMW's short vane and vane without foil structures literally infringe claims 1 and 12 of the '269 patent. He also found that the vane with foil structure literally infringes claims 1, 12, 15, 16, and 22 of the '269 patent. The ITC agreed, and so adopted the findings and conclusions of the presiding officer respecting literal infringement.

With respect to all claims and embodiments, KMW attacks the ITC's determination of literal infringement by contending that its own headbox so resembles the prior art that the claims of the '269 patent cannot read on their headbox and still be valid. We reject this argument. Our finding above, that the '269 patent is valid notwithstanding the prior art, is premised on the conclusion that any apparatus within its claims would not have been obvious at the time the invention was made. An affirmative finding of literal infringement therefore necessarily means that KMW's headbox is not as similar to the prior art as KMW contends. KMW also argues that the ITC erred in adopting the presiding officer's conclusion that the '269 patent claimers are entitled to a broad construction because *1576 of the pioneer status of the invention, commercial success, and patent policy. Specifically, KMW contends that the invention claimed in the '269 patent contributed very little to the art, so that its claims should be limited to the embodiments described in the specification. We reject this contention for to accept it would be to read limitations into the claims which they do not contain. Apart from that

contention, KMW does not even suggest, nor can we discern for ourselves, any reason for reading claims 1 and 12 so narrowly that they do not read on headboxes incorporating KMW's short vane and vane without foil structures. We therefore affirm the ITC's determination that these headboxes literally infringe claims 1 and 12.

As to the vane with foil structure, KMW argues that the ITC ignored several features of a headbox incorporating such elements which remove it from the scope of the involved claims. We have considered all of these features, and find that the only one arguably applicable to the claims is that the trailing elements *with foils* extend through and beyond the slice opening, so that the trailing member is not "constructed to be self-positionable so as to be solely responsive to forces exerted thereon by the stock flowing *towards the slice*" as recited in the claims. (Emphasis ours.) Reading the claims in light of the specification, however, we conclude that the phrase "flowing towards the slice" merely expresses a direction of stock flow in terms of a reference point—the slice—a direction that one skilled in the art would readily understand to remain the same even though that reference point has been passed. That is to say, even though a small part of the stock minimally affecting the position of the whole trailing member may have passed through the slice, and so is technically flowing *away* from the slice, the position *36 of the trailing member is for the most part, if not altogether, still determined by forces exerted by stock flowing towards the slice. We reach this conclusion whether or not the claims are given a broad construction. Based on this conclusion, we affirm the ITC's determination that the vane with foil embodiment of KMW's headbox literally infringes claims 1, 12, 15, 16, and 22 of the '269 patent.

The '593 Patent

Validity

The '593 Verseput patent matured from an application which was a continuation-in-part of an application filed December 3, 1971. The presiding officer found that the invention described and claimed in the '593 patent was actually reduced to practice as early as June 7, 1970. The '269 patent, just discussed, is a reissue of patent No. 3,607,625 dated September 21, 1971, and applied for January 17, 1968. The '269 patent is therefore prior art with respect to the '593

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patent by virtue of 35 U.S.C. § 102(e). In fact, Beloit concedes it to be the most pertinent prior art, and states in its brief:

These same principles utilized in the '269 headbox for making single ply paper were found by Mr. Verseput to be exploitable in the manufacture of multi-ply paper wherein different types of paper-making stock are supplied in a multi-ply headbox between the self-positionable elements. Again, because the self-positionable elements extend pondside to pondside the different types of stock are maintained segregated in the headbox so that no mixing of the stocks occurs, and upon exiting the headbox the absence of shear forces due to the equal velocities of the adjacent stock flows achieves just the right amount of intermingling of fibers between adjacent layers so as to provide good bonding without destroying the layer purity.

Thus, as the presiding officer put it, the '593 patent' describes a headbox "whose structure and functions, generally speaking, are substantially the same as the Converflo single layer headbox described in the '269 patent', modified by suitable partitions to convert the single ply headbox into a multi-layer headbox." Thus, the question is whether this innovation would have been obvious to one of ordinary skill in the art as of June 7, 1970.

1577 [6]** After reviewing the exhibits and testimony of record and the arguments of counsel, we conclude that the headbox claimed in the '593 patent' would have been obvious from the '269 patent' in view of the German patent. Certainly, *how* to convert the single ply headbox described in the '269 patent' into a multi-ply headbox would have been clear from the German patent's teaching of a multi-ply stock feeding and delivery system. As Beloit's technical expert, Professor Waller, acknowledged during cross-examination, it would have entailed only supplying two sources of stock, dividing the pre-slice chamber, and extending one of the trailing members all the way to the slice opening. Given the obviousness of how to construct such a headbox, any nonobviousness must arise from the *37** act of realizing that constructing such a headbox would be advantageous. That realization, however, would have been obvious as well.

We are aware that Professor Waller also testified that because of certain technical considerations, such as

problems produced when the stocks have a relative velocity at their confluence, it would have been, and in fact was, surprising to one of ordinary skill in the art that the '593 headbox worked as well as it did. We appreciate that this testimony went essentially unchallenged and would normally show that it would not have been obvious to combine the teachings of the '269 and German patents. In the circumstances of this case, however, the prior art '269 patent' teaches that at least two major advantages inure from use of the headbox described therein, those being a high degree of fiber dispersion and a low level of turbulence in the discharge jet. One skilled in the art, deemed to be aware of these teachings, would have had ample reason to take the natural and obvious step of carrying them over to the closely related, well known multi-ply papermaking art, despite any apprehension of problems caused by a potential relative velocity of stocks. Apparently there were no such problems.

In reaching the above conclusion, we of course have given effect to the statutory presumption of validity accorded the '593 patent' by 35 U.S.C. § 282. In this case, however, there is prior art, the German patent, which was not cited by the examiner but was conceded by Beloit's technical expert to be, in certain crucial aspects, more pertinent than art the examiner did cite. As stated in Solder Removal Co. v. ITC, 582 F.2d 628, 199 USPQ 129 (Cust. & Pat.App.1978),

Rebuttal of the presumption may be more easily had and more often achieved in reliance on prior art more pertinent than that considered by the examiner; but whether rebuttal is achieved requires careful consideration of whether the prior art relied upon does in truth render the claimed invention anticipated or obvious.

Our careful consideration of the prior art in this case leads us to conclude that KMW has carried its burden and effectively rebutted the presumption.

We have also taken into account the evidence of long-felt need and commercial success, but in this instance we deem it insufficient to persuade us of validity. The dominant reason is that the '269 headbox, which is prior art crucial to our finding of invalidity, itself achieved commercial success and satisfied a long-felt need. Thus it undoubtedly contributed to the success of the '593 headbox, which incorpo-

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rates its teachings, diminishing the weight usually given to success of an improvement invention.

Thus, as stated at the outset, we hold the claims in suit of the '593 patent invalid for obviousness under § 103 and reverse the contrary determination of the ITC.

****38 The Injury To a Domestic Industry Determination**

[7] The ITC defined the domestic industry as that portion of Beloit's facilities which exploits *both* patents, and determined that KMW's unfair acts have a tendency to substantially injure the domestic industry. This determination was premised, in part, on the antecedent determinations that both the '269 and '593 patents are valid and infringed. Our contrary conclusions with respect to the '593 patent thus may have an effect on the continued propriety of the ITC's injury determination, *1578 including its definition of domestic industry. We therefore vacate that determination and remand this case to the ITC to reconsider, if necessary, its injury determination and definition of domestic industry in light of the foregoing.

Alleged Deprivation of Procedural Rights

As mentioned at the outset, after the President disapproved on policy grounds the order arising from the first investigation, the ITC initiated a second investigation on its own motion. The notice of this investigation stipulated that no issue concerning the violation of section 337 addressed in the first investigation would be relitigated unless (1) a party filed a petition presenting new evidence concerning the violation alleged in the first investigation and showing good cause for relitigation, and (2) the ITC granted the petition. KMW thereafter petitioned the ITC to "introduce new evidence and to amplify and update the record." Specifically, KMW asked for permission to:

1) amplify the record to show that there has been head-to-head competition between Beloit's single layer headboxes which can be converted to make multilayer paper and KMW's multilayer headboxes which can be converted to make single layer paper;

2) amplify the record to show that the short-vane version * * * of the two KMW headboxes sold to

Scott Paper Company was intended for use as a single layer headbox so that the "domestic industry" should have been broadened to include it in the prior investigation;

3) introduce evidence relating to the structure and operation of KMW's modified multilayer headbox and to obtain a determination that it does not infringe the claims of either of the patents; and

4) have discovery necessary to amplify and update the record on the issue of injury to a domestic industry.

KMW's petition was opposed jointly by Beloit and the Commission Investigative Attorney because it did not conform to the requirements enunciated in the notice of investigation. The ITC agreed, and so denied the petition.

KMW contends on appeal that the ITC's denial of its petition deprived it of its statutory right to present all defenses in an investigation. The statute relied upon is 19 U.S.C. § 1337(c), which provides in part that all legal and equitable defenses may be presented in all **39 cases. Also implicated in the arguments on this point is 19 U.S.C. § 1337(g)(2), which provides in part that determinations disapproved by the President shall have no force or effect.

[8] We are not persuaded that the ITC's actions in this case contravene any of the provisions of section 337. Section 337(c) was not violated; KMW had adequate opportunity to present its legal and equitable defenses, albeit during the first investigation. Thus, in this case, the ITC's violation determinations were based on a record compiled in a case where KMW could have the opportunity to and in fact did present its legal and equitable defenses. Also, the ITC set up a procedure to ensure that if evidence concerning additional defenses had arisen since the compilation of the record in the first investigation, the record could be expanded accordingly. KMW has not shown that the additional evidence it sought to introduce in the second investigation was not available in the first investigation. In the circumstances of this case, the ITC's actions satisfied section 337(c). Nor did the ITC violate section 337(g)(2); it did not give the *determination* arising out of the first investigation either force or effect. What it salvaged from the first investigation were the record and the findings and conclu-

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sions of the presiding officer. There is no statutory prohibition against giving them continued effect. Thus, the ITC's procedure in this case was not contrary to statute. When KMW presented a petition which was not in conformity with the conditions of the second investigation, and we agree with the ITC that it was not, the ITC properly denied it.

Conclusion

The findings of validity and infringement of the claims in suit of the '269 patent are *1579 affirmed. The finding of validity of the claims in suit of the '593 patent is reversed. The determination of tendency to substantially injure a domestic industry is vacated, and the case is remanded for reconsideration in light of our finding of invalidity of the '593 patent. We find no error in the ITC's procedures in this case.

AFFIRMED IN PART, REVERSED IN PART, VACATED IN PART, AND REMANDED.

C.A.Fed.,1983.
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► United States Court of Customs and Patent Appeals.
Application of Kosei NOMIYA et al.
Patent Appeal No. 74-514.

Feb. 6, 1975.

An appeal was taken from decision of the Patent Office Board of Appeals which affirmed the rejection of claims 1-8 and 33 in application serial No. 768,794. The Court of Customs and Patent Appeals, Rich, J., held that claims 1-8 and 33 pertaining to insulated gate-type field-effect transistors and their use in semiconductor capacitive memory circuits having very low capacitance were improperly rejected for obviousness.

Reversed.

West Headnotes

[1] Patents 291 ↪ 16(2)

291 Patents
291II Patentability
291III(A) Invention; Obviousness
291k16 Invention and Obviousness in General
291k16(2) k. Prior Art in General. Most Cited Cases
(Formerly 291k18)

Patents 291 ↪ 51(1)

291 Patents
291II Patentability
291III(D) Anticipation
291k50 Prior Knowledge or Use
291k51 Nature and Extent in General
291k51(1) k. In General. Most Cited Cases
Applicants' representations in their application could be accepted at face value as admissions that figs. 1 and 2 could be considered "prior art" for any purpose, including use as evidence of obviousness, and

fact that invention may have been made in Japan was of no consequence in light of admissions. 35 U.S.C.A. §§ 102, 103.

[2] Patents 291 ↪ 16.5(4)

291 Patents
291II Patentability
291III(A) Invention; Obviousness
291k16.5 State of Prior Art and Advancement Therein
291k16.5(4) k. Remedying Defects or Solving Problems. Most Cited Cases
(Formerly 291k16.9, 291k18)
A patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. 35 U.S.C.A. § 103.

[3] Patents 291 ↪ 16(1)

291 Patents
291II Patentability
291III(A) Invention; Obviousness
291k16 Invention and Obviousness in General
291k16(1) k. In General. Most Cited Cases
(Formerly 291k18)
Court must not read obviousness into an invention on the basis of applicant's own statements; that is, court must view prior art without reading into that art applicant's teachings. 35 U.S.C.A. § 103.

[4] Patents 291 ↪ 16(3)

291 Patents
291II Patentability
291III(A) Invention; Obviousness
291k16 Invention and Obviousness in General
291k16(3) k. View of Person Skilled in Art. Most Cited Cases
(Formerly 291k18)
There must be a reason, apparent at time invention was made, to person of ordinary skill in the art for applying the teaching at hand, or the use of the teach-

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ing as evidence of obviousness will entail prohibited hindsight. 35 U.S.C.A. § 103.

[5] Patents 291 ↪ 16.29

291 Patents

291II Patentability

291II(A) Invention; Obviousness

291k16.29 k. Electricity, Electronics and

Radio. Most Cited Cases

(Formerly 291k18)

Claims 1-8 and 33 pertaining to insulated gate-type field-effect transistors and their use in semiconductor capacitive memory circuits having very low capacitance were improperly rejected for obviousness. 35 U.S.C.A. § 103.

Patents 291 ↪ 328(2)

291 Patents

291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original. Most Cited Cases

3,408,511. Cited as prior art.

*566 Paul M. Craig, Jr., Washington, D.C., attorney of record, for appellants.

Joseph F. Nakamura, Washington, D.C., for the Commissioner of Patents; R. V. Lupo, Washington, D.C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, Judges.

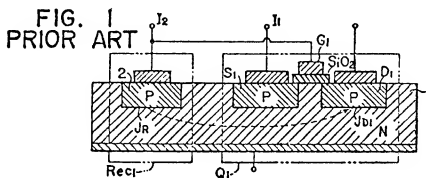
RICH, Judge.

This appeal is from the decision of the Patent Office[FN1] Board of Appeals affirming the rejection under 35 U.S.C. § 103 of claims 1-8 and 33 in application serial No. 768,794, filed October 18, 1968, for 'Semiconductor Circuit Devices Using Insulated Gate-Type Field Effect Elements Having Protective Diodes.' We reverse.

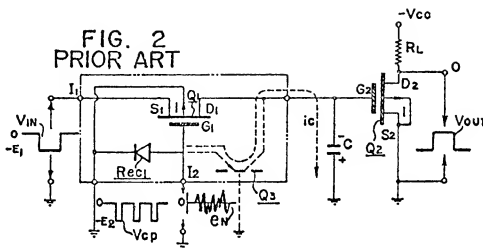
[FN1. Pub.L. 93-596, effective January 2, 1975, changed the names of the Patent Office and the Commissioner of Patents to the 'Patent and Trademark Office' and the 'Commissioner of Patents and Trademarks,' respectively. For convenience and brevity hereinafter we shall use the abbreviation PTO.

The Invention

Appellants' invention pertains to insulated-gate-type field-effect transistors (hereinafter IGFET) and their use in *567 semiconductor capacitive memory circuits having very low capacitance. For ease of discussion we reproduce Figs. 1 and 2 of the application:



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The structure of Q1 in Fig. 1 is an IGFET, consisting of two P-type[FN2] regions, S1 and D1, diffused into an N-type starting crystal, or substrate, usually of silicon, with an insulating oxide layer SiO₂ formed on the surface of the N-type substrate and contacting the diffused P-type regions. A metal gate electrode G1 is attached to the insulating layer. IGFETs used as switching devices, as contemplated by appellants, are customarily fabricated in the OFF-mode. In this mode, when no voltage is applied to the gate, the two P-type regions, called source (S1) and drain (D1), are electrically insulated from each other by the N-type region surrounding them. However, when a negative voltage, such as a clock pulse, is applied to the gate, the electric field so produced induces a thin P-type channel across the surface of the N-type region connecting the source and the drain, permitting a current to pass between them. See *In re Carlson*, 412 F.2d 255, 56 CCPA 1309 (1969). Fig. 2 is a circuit diagram of a dynamic shift register employing the IGFET device of Fig. 1 *568 as a switch to control a bit of information stored in capacitor C, which may be distributive capacitance of the circuit.

FN2. A P-type semiconductor contains more holes, or electron gaps in the lattice of the material, than it does electrons free of covalent bonds in the lattice. An N-type material has an excess of free electrons over holes. These electrons and holes are referred to as 'carriers'; 'minority carriers,' mentioned infra, are electrons in P-type semiconductors and holes in N-type semiconductors.

According to the application,

*** since the gate G1 of an insulated gate-type field effect transistor Q1 as shown in Figure 1 has a high capacitive input impedance, a very small amount of electric charge accumulated on the gate G1 induces a high voltage and sometimes causes the insulating film (usually silicon dioxide) between the gate G1 and semiconductor substrate 1 to break down. Therefore, it has been proposed that a protective diode be formed, i.e. a zener diode Rec1, integrally in the semiconductor body 1 and that the diode be connected in parallel with the gate G1 as shown in Figure 1. It has been believed that the protective diode could prevent the insulating film from breakdown without interfering with the characteristics of the field effect transistor.

Appellants claim to have discovered that when IGFETs having protective diodes formed in the same substrate, as shown in Fig. 1, are used as switches for storing information or input signals in a memory element having very small capacitance (C on Fig. 2), parasitic transistor action between the protective diode and the drain region may take place when the PN junction JR of the protective diode Rec1 is forward biased[FN3] by a noise signal, causing the signal stored in the memory element to discharge through the drain region D1 despite the lack of a pulse applied to the gate electrode. The solution to this problem found by appellants, which they claim as their invention, is a voltage-limiting means auxiliary to the protective diode, which can be a high resistance or another protective diode (hereinafter called 'shunt

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diode”), formed outside the substrate or electrically isolated from other circuit elements on the substrate, connected in parallel with and in the same direction as the protective diode Rec1.

FN3. ‘Forward bias’ is the application of a potential difference to a P-N junction in the direction which aids current flow across the junction.

Claim 1, with reference letters keyed to Fig. 1 and emphasis supplied, is illustrative:

1. In a semiconductor device comprising:

an insulated gate-type field effect component (Q1) including a semiconductor substrate (1) of first conductivity type, source (S1) and drain (D1) regions of second conductivity type opposite to said first conductivity formed in a surface of said semiconductor substrate, and an insulated gate electrode (G1) disposed on said surface between said source and drain regions and insulated from said substrate by an insulating film (SiO₂); and

a protecting semiconductor diode (Rec1) formed integrally in said substrate and connected in parallel between said insulated gate electrode and said semiconductor substrate for protecting the insulating film interposed between said gate electrode and said substrate from breakdown; the improvement comprising

auxiliary means connected with said semiconductor device for preventing minority carriers from said protecting semiconductor diode from reaching said drain region through said semiconductor substrate when noise signals are applied to the protecting diode.

Claim 2 is similar to claim 1 and is cast in the same ‘Jepson’ form. Dependent claims 3-8 depend from claim 2 and recite various added limitations. Claim 33 defines a ‘memory circuit device’ containing appellants’ invention. If claim 1 is patentable, so are the other claims.

The Rejection

The examiner cited Bergersen et al. (Bergersen) U.S. patent 3,408,511, issued October 29, 1968 on an application filed May 13, 1966. The Bergersen specifi-

cation states in part:

This invention relates to an improved insulated-gate field-effect transistor (IGFET) circuit having large bipolarity*569 voltage capabilities. This circuit is operative as an active component of an electronic chopper or an electronic analog switching circuit and is adapted to receive large bipolarity analog input signal voltages.

When an insulated-gate field-effect transistor is used in analog switching or chopper circuits, it must be voltage controlled in such a manner that the P-N junctions between semiconductor substrate and source regions and between semiconductor substrate and drain regions do not become forward biased and enable current to flow from either the substrate region to the source region or from the substrate region to the drain region, respectively. This requirement means that the insulated-gate field-effect transistor can only handle input signals of a limited amplitude if these signals are connected directly in parallel with either of the above defined P-N junctions and between one of the source or drain regions and the substrate region, which is usually at ground potential. If, using the above-described connection, the input signals applied across either of the P-N junctions would be at a voltage level sufficiently high to forward bias these P-N junctions into conduction, then an alternative input signal connection must be resorted to. One such alternative connection involves disconnecting the substrate region from its ground return and from the source of input signals, leaving the substrate region floating. This mode of IGFET operation will prevent the P-N junctions between substrate and source regions and between substrate and drain regions from becoming forward biased, but it will also subject the substrate region to extraneous noise pickup and this is obviously an undesirable compromise for enabling the insulated-gate field-effect transistor to handle large bipolarity signals connected between either source or drain and substrate regions.

A feature of this invention is the provision of an insulated-gate field-effect transistor circuit including adjacent source, substrate and drain regions with a P-N junction between the substrate and source regions and a P-N junction between the substrate and drain regions. A voltage limiting circuit is connected to the substrate region and includes a diode which is connected between the substrate region and either the

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source or the drain region. This diode becomes conductive for large amplitude signals of one polarity which are applied to one of the source or drain regions and thereby protects one of the above-identified P-N junctions from becoming forward biased. When large amplitude input signals of an opposite polarity are applied to the same source or drain region, this diode becomes reverse biased and prevents the input signals from reaching the other of the two P-N junctions, and forward biasing this junction.

The substrate region * * * and the source and drain regions * * * are analogous to two spatially separated diodes connected back to back. Since the source and drain regions * * * are isolated by the substrate region * * * any drain to source current or source to drain current in the absence of a gate voltage is extremely low. The P-N junctions * * * of the so-called back to back diodes defined above must not be allowed to become forward biased for any amount of channel conduction since this would cause extraneous currents to flow to the input and output circuits of a practical chopping or switching device * * *.

It is significant that Bergersen does not explicitly disclose a protective diode formed in the same substrate as the IGFET so protected.

In order to understand one of appellants' arguments, we must look to the PTO position as it developed. In his *570 first rejection of the appealed claims the examiner said:

Applicant's (sic) figures 1 and 2 (reproduced supra) illustrate the prior art. Bergersen et al teach the prevention of a diffused N region in a P substrate from being biased in the forward direction by the input signals through the use of a shunt diode and a resistor. Pursuant to this teaching it is obvious to one of ordinary skill in the art to prevent any of the diode junctions of Applicant's (sic) prior art figures from becoming forward bias (sic) through the use of a shunt diode. No new novel or unexpected result is seen to occur by so doing.

The Examiner's Answer on appeal states that 'Applicant's (sic) figure 1 shows the prior art,' and concludes:

In the prior art diode protected IGFET the protection diode is usually used to prevent spurious signals, i.e. noise from damaging the gate insulator. Noise is usu-

ally bipolar. As such it is rather apparent that the noise signal will forward bias the prior art protection diode. Thus the prior art protection diode is known to operate on bipolar signals, both positive and negative, otherwise only half the protection for the gate insulator would be present. Bergersen et al disclose that noise signals will undesirably forward bias junctions of an IGFET. Forward biased junctions in IGFET'S are undesirable as they create leakage currents between the input and output. The solution to the problem as per Bergersen et al. is to prevent the junction from becoming forward biased by shunting the junction with a diode of lower threshold voltage. Pursuant to this teaching it is obvious to one of ordinary skill in the art to add a shunt diode across the protection diode of the prior art that becomes forward biased during half of the protection function. No new, novel, or unexpected results are seen to occur by so doing. Germanium diodes are well known to have a lower threshold voltage than silicon diodes, thus being an obvious design choice to use in the application of the teachings of Bergersen et al.

The board adopted the examiner's reasoning and added some of its own, stating:

We find it logical to apply the teaching of Bergersen et al. to any junction on a single chip. One skilled in the art having studied Bergersen et al. and looking at appellants' Figure 1 would realize and understand that a diode provided purely for gate protection which is integrated into the same chip as the FET might be a source of undesired minority carrier injection from forward biasing in the same way as the source or drain in a field effect transistor as described by Bergersen et al.

We have no doubt that the examiner is relying on the admitted prior art of Figures 1 and 2 of appellants' drawing. We agree with appellants that the dotted line showing of the transistor action resulting from the forward biasing of the protective diode as depicted in Figure 2 should not be considered as prior art. The dotted line showing clearly represents appellants' contribution and in our opinion the examiner has so construed it.

OPINION

Appellants' brief now questions the PTO's use of Figs. 1 and 2 of their application as 'prior art' under 35 U.S.C. s 103, arguing that there is no statutory

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basis for considering Figs. 1 and 2 to be 'prior art' in the § 103 sense. The oath in the application shows that appellants are citizens and residents of Japan; presumably the invention was made in Japan. Appellants point out that what may have been known to them in Japan would not be prior art by virtue of any portion of 35 U.S.C. § 102.

[1] We see no reason why appellants' representations in their application should not be accepted at face value as admissions that Figs. 1 and 2 may be § 571 considered 'prior art' for any purpose, including use as evidence of obviousness under § 103. In re Garfinkel, 437 F.2d 1000, 1004, 58 CCPA 883, 887 (1971); In re Hellsund, 474 F.2d 1307, 1311, 59 CCPA 1382, 1387 (1973). [FN5] By filing an application containing Figs. 1 and 2, labeled prior art, ip-sissimis verbis, and statements explanatory thereof[FN6] appellants have conceded what is to be considered as prior art in determining obviousness of their improvement. That appellants' invention may have been made in Japan is of no consequence in light of their admission.

FN5. Although the author of this opinion did not join the opinion of the court in Hellsund, there was no disagreement among the members of the court with the basic proposition that a statement by an applicant, whether in the application or in other papers submitted during prosecution, that certain matter is 'prior art' to him, is an admission that that matter is prior art for all purposes, whether or not a basis in § 102 can be found for its use as prior art. The point of controversy in Hellsund was not whether a binding admission had been made, but what was admitted. The opinion of the court called it an admission of 'prior art,' but the author of this opinion found it to be an admission merely that the Opel patent contained a disclosure of an invention made prior to Hellsund's invention.

FN6. The application contains a section entitled 'Description of the Prior Art,' which explains Figs. 1 and 2 in detail. We note also that appellants, in an amendment to the application and in their briefs on appeal to the board, repeatedly acknowledged that Figs. 1 and 2 illustrate the prior art.

It is necessary to consider everything appellants have said about what is prior art to determine the exact scope of their admission. The relevant portion of the specification under the heading 'Description of the Prior Art' states:

According to investigation, however, it has been revealed that since the PN junction JR of the diode Rec1 is biased in the forward direction by noise pulses eN, a bipolar transistor is formed (with) the region 2 (as an emitter), the substrate 1 (as a base) and the drain region D1 of the field effect transistor Q1 (as a collector) since the junction JD1 is usually biased in the backward direction. Minority carriers injected into the substrate 1 from the diode region 2 diffuse in the substrate 1 and reach the drain region D1, as shown by the broken line arrow in Figure 1. (Emphasis added.)

The board in its opinion, *supra*, conceded that the bipolar transistor action described by appellants in the passage above quoted was not part of the admitted prior art.[FN7] Therefore, on this record, the admission is only that the structure shown in Figs. 1 and 2 combining an IGFET and its protective diode in a common substrate and the use of that structure in a dynamic shift register circuit were known to the art when appellants invented their improvements.

FN7. It is clear from the specification that the dotted line of Fig. 2 referred to by the board represents the same phenomenon as the 'broken line arrow' on Fig. 1.

[2][3] What we said in In re Sponnoble, 405 F.2d 578, 585, 56 CCPA 823, 832-833 (1969), is relevant here:

It should not be necessary for this court to point out that a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103. In re Antonson, 272 F.2d 948, 47 CCPA 740; In re Linnert, 309 F.2d 498, 50 CCPA 753. The court must be ever alert not to read obviousness into an invention on the basis of the applicant's own statements; that is, we must view the prior art without

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reading into that art appellant's teachings. In re Murray, 268 F.2d 226, 46 CCPA 905; In re Sporck, 301 F.2d 686, 49 CCPA 1039. The issue, then, is whether the teachings of the prior art would, in and of themselves and without the benefits of appellant's disclosure, make the invention as a whole, *572 obvious. In re Leonor, 395 F.2d 801, 55 CCPA 1198.

See also In re Conover, 304 F.2d 680, 49 CCPA 1205 (1962). Appellants' specification identifies the problem discovered by them in part as follows:

The emitter common current amplifier factor of this transistor structure (Fig. 1) is in the order of 10-3 to 10-4. This factor of the transistor structure is much smaller than those of usual bipolar transistors (in the order of several tens to several hundreds). Therefore, the parasitic bipolar transistor seems to be of negligible value because of the extremely small current amplifier factor.

When an insulated gate-type field effect transistor having a protective diode is used as a control switch for storing an information signal or an input signal in a memory element having very small capacitance, the parasitic bipolar transistor, according to our study, cannot be neglected even if the current amplifier factor is extremely small as aforementioned. ***

Since the zero voltage level part of the pulse VCP, however, often includes a noise signal eN (Fig. 2) which comprises high frequency components of fairly large amplitude, *** the diode Rec1 is biased in the forward polarity by the noise signal eN. Only in this instant, a parasitic bipolar transistor Q3 is constructed, the collector current iC flows through the transistor Q3 and the capacitor C in spite of the OFF-state of the transistor Q1. Therefore the stored charge in the capacitor C discharges. Especially in such a memory circuit device as that which uses a capacitive memory element of very little capacitance an extremely small amount of collector current iC of the parasitic transistor Q3 causes the (charge) stored in the capacitor C to be reduced considerably since the amount of the stored charge is very small, and it results in misoperation of the memory circuit device.

If, as appellants claim, there is no evidence of record that a person of ordinary skill in the art at the time of appellants' invention would have expected the problem in the IGFET to exist at all, it is not proper to conclude that the invention which solves this prob-

lem, which is claimed as an improvement of the prior art device, [FN8] would have been obvious to that hypothetical person of ordinary skill in the art. The significance of evidence that a problem was known in the prior art is, of course, that knowledge of a problem provides a reason or motivation for workers in the art to apply their skill to its solution. Logically, the instant situation is one step removed from the circumstances illustrated by Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45, 67-68, 43 S.Ct. 322, 67 L.Ed. 523 (1923), where the problem of rippling in paper produced on Fourdrinier paper-making machines at high speed was known, but the source of the problem was not.

[FN8. The matter in claim 1 before the word 'improvement' reads on Fig. 1, supra. By using this 'Jepson' form, appellants are relying solely on the subject matter following 'improvement' to provide patentable distinction over the prior art.

Thus, we must first ask the question: does Bergersen, when considered in conjunction with the prior art structures disclosed in Figs. 1 and 2, suggest the existence of the problem solved by appellants? We think not. While we agree with the PTO that Bergersen supplies the obvious expedient of using voltage limiting means to prevent the injection of minority carriers (i.e., extraneous currents) from a forward-biased PN junction of the IGFET into the IGFET substrate, we find nothing in Bergersen which, when applied to a structure having a protective diode disposed in a common substrate with an IGFET and not insulated electrically therefrom, is evidence that a person of ordinary skill in the art would have recognized that the misoperation of IGFET memory elements employing such a protective diode was caused by forward biasing of the PN junction, not of the IGFET, but of *573 the protective diode. Bergersen, in fact, is better evidence for the conclusion that a person of ordinary skill in the art would consider that the protective diode Rec1 of Fig. 1 would prevent injection of minority carriers into the IGFET substrate, not be a cause thereof.

[4] The board attempted to overcome the lack of nexus between Bergersen's teachings and the structure of Fig. 1 by saying that 'it (is) logical to apply the teachings of Bergersen et al. to any junction on a single chip.' There must, however, be a reason ap-

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parent at the time the invention was made to the person of ordinary skill in the art for applying the teaching at hand, or the use of the teaching as evidence of obviousness will entail prohibited hindsight. Graham v. John Deere Co., 383 U.S. 1, 36, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). From the portion of Bergersen quoted supra, it appears that the single protective diode of Bergersen would protect one IG-FET PN junction from becoming forward biased when signals of a particular polarity are applied to the source or drain region of the IGFET, and would protect the other PN junction when signals of the reverse polarity are applied. While this teaching is available to show that any PN junction may be protected from forward bias by a shunt diode, it does not suggest a problem, or the solution thereto, concerning an IG-FET with a protective diode formed in the same substrate in the absence of knowledge that forward bias on the protective diode causes parasitic transistor action or other undesirable phenomena between the PN junction of the protective diode and the source-substrate or substrate-drain PN junction of the IG-FET. Parasitic transistor action for the IGFET use contemplated by appellants was a significant source of faulty operation. The board recognized that appellants contributed this knowledge.

The solicitor's argument begs the question:

While it may be true that appellants were the first to recognize and describe the existence of a 'parasitic bipolar transistor,' that recognition and description, while a professional credit to appellants, is not sufficient to establish the patentability of the claims. After all, what causes the existence of the parasitic bipolar transistor in appellants' system is the forward biased P-N Junction-the same problem recognized in the Bergersen patent.

It is, of course, not the same problem since Bergersen makes no suggestion that bipolar transistor action might occur when the protective diode and IGFET are formed in a common substrate.

[5] On this record, therefore, we find no evidentiary basis for the finding that a person of ordinary skill in the art would have had reason to apply an additional shunt diode (or other voltage-limiting means) to an IGFET already equipped with a protective diode formed in the same substrate.

The rejection of claims 1-8 and 33 is reversed.

Reversed.

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